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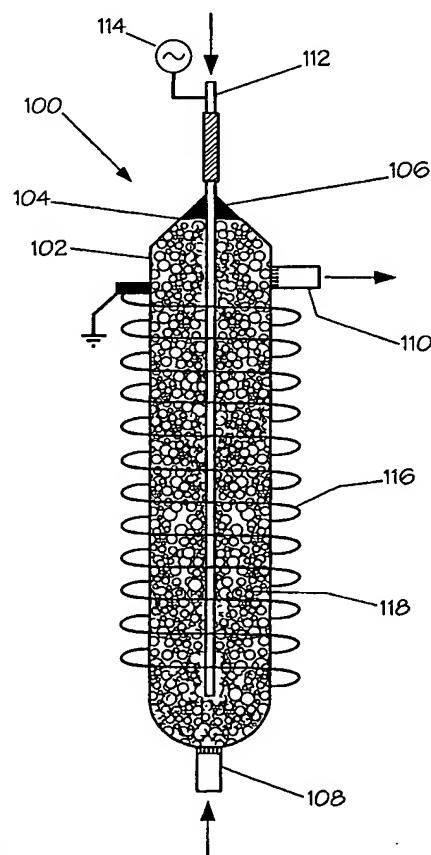
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[Continued on next page]

## (54) Title: PLASMA TREATMENT WITHIN DIELECTRIC FLUIDS



(57) Abstract: A dielectric liquid having entrained bubbles of gas or vapor is subjected to an electric field applied between spaced electrodes (112, 116) which generates microdischarges (and thus plasma) within the bubbles, allowing modification of the properties of the dielectric liquid. The invention is particularly useful for treating hydrocarbon liquids such as gasolines and other liquid hydrocarbon fuels, which have extremely low dielectric constants. Generating microdischarges within bubbles in such fuels can create compounds useful for higher combustion efficiency and/or lower emissions in internal combustion engines. The invention may be directly implemented in an engine's fuel line upstream from the combustion chamber (e.g., immediately prior to a fuel injector), thereby allowing the invention to be usefully implemented for fuel treatment prior to combustion.

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# INTERNATIONAL SEARCH REPORT

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## A. CLASSIFICATION OF SUBJECT MATTER

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 US CL : 204/164-169, 172; 219/60R; 422/186.04

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

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Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)  
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## C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages   | Relevant to claim No. |
|------------|--|-----------------------|
| X          | WO 99/47230 B (ZADIKARA et al.) 23 September 1999, see abstract, Fig. 2, -3, page 3, lines 27-32, page 10, lines 17-29, page 14, lines 27-30, page 15, lines 27-32 and page 19, lines 14-16. | 1-3, 6, 13, 15        |
| ---        |  | _____                 |
| Y          | US 6,284,105 B1 (ELIASSON et al.) 4 September 2001, see abstract, Figs. 1-3, col. 5, lines 27-64, col. 6, lines 6-49 and col. 10, lines 6-13.  | 7-10, 16-20           |
|            |  | 1-30                  |

Further documents are listed in the continuation of Box C.

See patent family annex.

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